

REMARKS

Claims 16-17, 19-35, 37-43, 48 and 51-55 are currently pending in the present application of which claims 21-22 and 26-30 have been withdrawn pursuant to 35 USC 121 and claims 53-55 are new. Accordingly, claims 16-17, 19-20, 23-25, 31-35, 37-43, 48 and 51-55 are under consideration.

Independent claims 16 has been amended to more distinctly claim the invention. In particular, claim 16 has been amended to recite a first step of forming an initial buffer layer and then spreading the liquid on the initial buffer layer and also amend it to recite the lattice constant of the initial buffer layer is between that of the substrate and that of the overgrown alloy film. Adequate written descriptive support for this amendment can be found throughout the detailed specification. Accordingly, no new matter issues are raised by this amendment.

Rejection Under 35 USC 112

Claim 16 was rejected under 35 USC 112 as allegedly failing to provide written descriptive support for the step of spreading a liquid comprising one or more Group III compounds. The rejection is traversed and it is respectfully submitted that one of skill in the art would have recognized that Applicant was in position of the claimed subject matter.

Claim 16 is fully supported by the specification. It appears that the Examiner's primary concern regarding the language of claim 16 is that several of the embodiments disclosed in the application are not covered by the claimed subject matter. However, there is no requirement that a claim must cover any particular number of the embodiments of an application. It is sufficient that there is written description, even if that description is directed to fewer embodiment, to meet the standard under 35 USC 112. Accordingly, reconsideration and withdrawal of the rejection under 35 USC 112, first paragraph, are respectfully solicited.

Rejection Under 35 USC 103

The pending claims were rejected under 35 USC 103 as being unpatentable over Nakamura in view of Puchinger or Aldinger or other references of record. The rejection is traversed and it is respectfully submitted that the claims pending in the application are patentable within the meaning of 35 USC 103.

Independent claim 16 recites a method of growing a nitride alloy film over an initial buffer layer by spin coating a liquid onto the initial buffer layer, then annealing the spin coated layer and finally growing the Group III-V nitride alloy film. The claim further requires that lattice constant of the initial layer is between that of the substrate and that of the overgrown nitride alloy film. The other independent claim share common features that would not have been recognized by those skilled in the art given the prior art cited by the Examiner. In particular, innovative points of this disclosure are that a spin-coated film is formed on nitridized sapphire substrate (see Second Embodiment), or that spin-coated film is formed on CVD grown thin SiC film on Si(111) substrate (see Fourth Embodiment), or that spin-coated film is formed on RF-sputtered ZnO on sapphire substrate (see Fifth Embodiment). The ideas are based on the findings that a spin-coated buffer layer is not enough by itself to relax the lattice mismatch between the substrate and the overgrown GaN epitaxial layer. The initial layer such as the nitridized layer or SiC layer or ZnO layer has closer lattice constants to the GaN than the substrates. Furthermore inserting the initial buffer layer prior to the spin-coating can eliminate the chemical reaction between the spin-coating layer and the substrate during the annealing for the recrystallization of the spin-coated film, resulting in better crystal quality, especially in the case of the growths on reactive silicon substrate. The technical advantage of the claimed subject matter is that the spin-coated film is more uniform in view of both the thickness and crystal quality than conventional

low temperature MOCVD grown buffer layer. The spin-coated buffer layer on initial buffer layer on the substrate improves the uniformity of crystal quality of the overgrown thick GaN layer with better crystal quality.

Accordingly, it is respectfully submitted that one of ordinary skill in the art would not have been motivated to modify the combination of references cited by the Examiner to arrive at the specific steps claimed by Applicant in the present application since one of ordinary skill in the art would not have recognized the benefits of such a process. Based on the foregoing, it is respectfully submitted that the claims pending in the application are patentable and should be allowed.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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